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NEW TYPES OF NON-TRADE-RELATED PARTICIPATION IN COMMODITY FUTURES MARKETS

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INTRODUCTION

1. To a large extent, the continuing and strong growth of commodity futures markets since the early 1980s has been fueled by the institutionalization of speculative activities. In the early 1980s, individual speculators in large numbers pooled their money in funds, and new financial tools opened up the possibility of involvement in futures markets to a much wider group of investors than before. Soon afterwards, new categories of institutional investors (in particular insurance and pension funds) started to put part of their vast holdings in commodity markets. Speculative activities in commodity futures markets have for a long time worried many commodity producers, consumers and in particular government policy-makers.[1] However, in most countries it is now fairly well accepted that speculators are the lubricant in the futures trading machinery and that the small investors, who until recently accounted for the majority of speculative business, do not have a negative influence on the validity of the futures markets' price formation process. However, the individual speculator of the past has been replaced to a major extent by large investment funds; and no consensus exists yet on the influence of these funds' activities on this price formation process.

2. In the proposals of the Group of Experts on Commodity Exchanges, as endorsed by the Standing Committee on Commodities at its second session (February 1994), the UNCTAD secretariat was inter alia urged to undertake in-depth research on the influence of the growing activities of investment funds in commodity exchanges, and in particular on whether and under what conditions their involvement encourages or discourages use by buyers and sellers of commodities.[2] This study reviews the available information on this issue, and brings out the main findings as concerns the direct and indirect use of futures exchanges by commodity buyers and sellers. It should be stressed that the findings can only be tentative, as investment fund activity in commodity futures markets is in full evolution. Investment funds became important players in futures markets only from 1986 onward, and their large-scale involvement in commodity futures markets dates only from the early 1990s; moreover, the modes through which this involvement is expressed are changing continuously.

3. This study is confined to the examination of various forms of new, non-trade related investment fund activities in commodity futures markets. Traditional speculative business, with

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[1] Speculation should be distinguished from manipulation. In the former, market participants try to forecast price movements on the basis of information on the "fundamentals" of supply and demand, or on the basis of a computer-assisted analysis of past futures price, turnover and open interest developments. They can be wrong, and their actions may result in price movements poorly related to the fundamental supply/demand situation, but this is not the result they envisage with their actions. In the case of manipulation, market participants deliberately try to move the market away from its fundamentals; an effort which has some chances of succeeding only if the manipulator controls a large share of both the futures market and physical stocks. As investment funds are very badly placed to try to manipulate commodity markets (controlling large quantities of physical products is difficult for them), the issue of manipulation will not be discussed in this paper.

[2] *Analysis of ways of improving the efficiency and use of existing mechanisms for the management of risks arising from commodity price fluctuations - Proposals of the Group of Experts on Commodity Exchanges*, TD/B/CN.1/10/Add.1, 27 September 1993.

larger and smaller individual investors betting on the way the market will move, is not covered. It sets out to describe the various forms of new fund-related investment in commodity futures markets and the reasons for its development. The available evidence as to the behaviour of these new investors, and the consequences of their participation on the functioning of commodity markets, are then reviewed. The intention here is not to discuss all aspects of risk management markets and their utility and implications for developing countries producers and traders, particularly small ones.[3]

[3] Various other aspects of commodity risk management and commodity risk management markets have been discussed in earlier UNCTAD papers. For a description of risk management instruments and markets see *A survey of commodity risk management instruments* (UNCTAD/COM/15/Rev.1), December 1994. For a critical analysis of the functioning of commodity exchanges, which have been set up to serve a developed country clientele and are not necessarily focussed on the needs of developing countries and countries with economies in transition, see *Technical and regulatory conditions influencing participation in, and usage of, commodity exchanges by both buyers and sellers of commodities* (UNCTAD/COM/16), April 1993. An overview of access barriers for developing countries is given in *Contribution to the improvement of the functioning of commodity markets, analysis of ways of improving the efficiency and use of existing mechanisms for the management of risks arising from commodity price fluctuations* (TD/B/CN.1/10), August 1993; two of the main barriers, namely a lack of intermediating institutions, and a lack of access to credit, are discussed in more detail in *Risk distribution after liberalization of commodity marketing and problems of access to risk management markets for developing country entities - illustrated by the case of coffee in Africa* (TD/B/CN.1/GE.1/2), August 1994, respectively *Counterpart and sovereign risk obstacles to improved access to risk management markets; issues involved, problems and possible solutions* (TD/B/CN.1/GE.1/3), August 1994.

Chapter I

THE GROWTH OF NON-TRADITIONAL INVESTMENT ACTIVITY IN COMMODITY FUTURES MARKETS

4. There are various forms of non-traditional investment activities in commodity markets. The first form is that of managed funds and similar investment vehicles, which are to some extent the result of the pooling of traditional speculative business. These managed funds are basically short-to medium-term traders who specialize on futures markets, and who move in and out of futures market positions relatively fast (they do not hold positions for a long time). They can be active on both sides of the markets, both long (buying contracts) and short (selling contracts that they do not yet own).

5. Secondly, there is the warrant-related business. Warrants are notes issued by financial firms, generally of a term longer than one year, which give investors a pay-off related to the the price of a commodity or a commodity index. Both the payment of principal and interest can be tied to the price of a commodity or an index, or only the interest payments; they can be of a "futures" type (for instance, the interest rate is fixed in a quantity of gold) or of an "option" type (for instance, the interest rate is minimal 1 per cent a year, with 0.2 per cent added for every US$ that gold prices during a reference period are higher than US$ 380/ounce). Warrants are used by investors as a "paper" alternative to taking a physical inventory into their portfolios. For example, an investment fund which considers that it should "own" a certain amount of gold or copper, as a fixed share of its portfolio (which may for the rest consist of equity, bonds, property and financial futures), could buy warrants on these products. The banks and brokers which issue the warrants do not carry the commodity price risks in-house, and although it is possible that some exposures will be internally matched, using a number of financial engineering techniques they generally lay off the major part of price risks in futures markets; in practice, this means that the issuing of warrants gives rise to the buying of futures contracts in relatively far-away months.

6. Thirdly, a number of banks and other financial institutions have started to use commodity markets simply as another financial market where they can place their funds to receive more attractive interest rates than those available on money markets. They generally purchase physical stocks (generally by buying "ownership certificates" on stocks of commodities held in warehouses that have been approved as delivery locations by one of the commodity exchanges), and simultaneously sell futures contracts in relatively far-away months; as long as they hold the stocks, these futures contracts are continuously rolled forward in further-away months. An overview of the different forms of non-trade related participation in commodity futures markets is given in chart 1 below.[4] These three new forms of non-trade related investment have different implications for the market, which will be discussed in more detail in this chapter.

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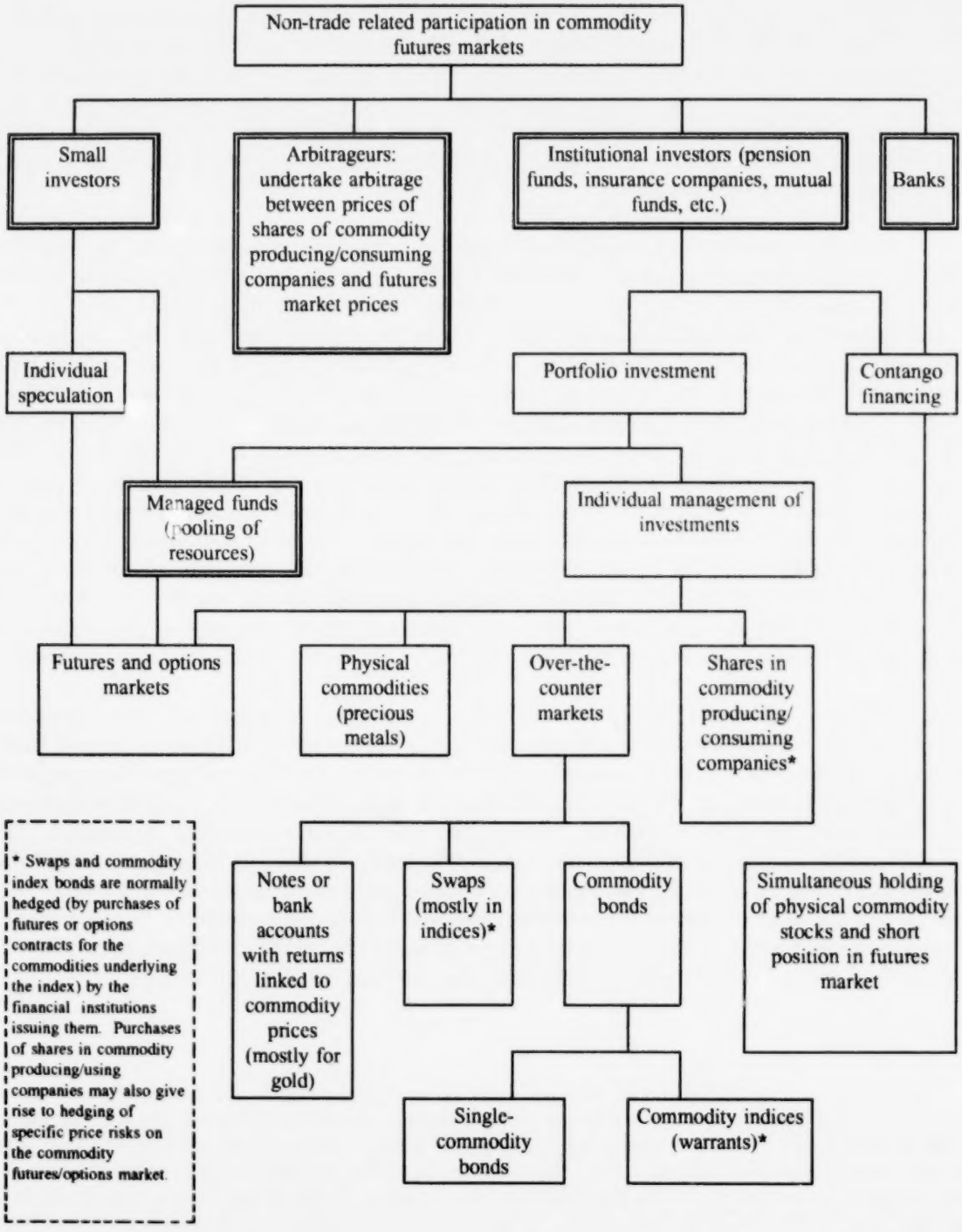
[4] This paper will not discuss investment funds which do not specialize on futures markets, but use futures markets to "hedge" part of the risks that they take on other markets. For example, they may buy silver futures to hedge the silver price risks of an investment in a photographic company, or buy oil futures to hedge the energy price risks of holding equity in an aluminium firm. Also, they may undertake "arbitrage" activities between futures and equity markets, for example by selling gold futures and buying equity in gold mining firms if gold futures have increased faster in price than gold firms' equity. Taking into account the forms that their involvement takes, these funds are not likely to have a systematic influence on the functioning of commodity markets, apart from improving liquidity - and given the importance of arbitrage activities in particular in the metals market, their contribution to market liquidity can indeed be large.

Chart 1

TYPES OF NON-TRADE RELATED INVESTORS AND THEIR ACTIVITIES IN COMMODITY MARKETS


Non-trade related participation in commodity futures markets
Small investors
Arbitrageurs: undertake arbitrage between prices of shares of commodity producing/consuming companies and futures market prices
Institutional investors (pension funds, insurance companies, mutual funds, etc.)
Banks
Individual speculation
Portfolio investment
Contango financing
Managed funds (pooling of resources)
Individual management of investments
Futures and options markets
Physical commodities (precious metals)
Over-the-counter markets
Shares in commodity producing/ consuming companies*
Notes or bank accounts with returns linked to commodity prices (mostly for gold)
Swaps (mostly in indices)*
Commodity bonds
Simultaneous holding of physical commodity stocks and short position in futures market
Single-commodity bonds
Commodity indices (warrants)*
* Swaps and commodity index bonds are normally hedged (by purchases of futures or options contracts for the commodities underlying the index) by the financial institutions issuing them. Purchases of shares in commodity producing/using companies may also give rise to hedging of specific price risks on the commodity futures/options market.

A. Commodities as an asset class

7. Large investors normally try to diversify their exposure: they take risks in a wide variety of markets, in search of what is for them an optimal risk/reward ratio. For a long time, commodities (apart from precious metals) were largely ignored by large portfolio investors. This was mostly because the commodity futures markets were not liquid enough, and did not offer contracts far enough in advance to be attractive for longer-term investment; besides, storage of physical commodities other than gold, silver or platinum was a rather awkward and expensive process. But then, a number of studies showed the advantages of portfolio diversification into futures contracts, including those for commodities.

8. The first such study, done in 1979, found that futures (commodity futures and the new financial futures combined) outperformed bonds and treasury bills in terms of profits, at a similar level of risk; also, futures returns were not correlated with the returns for stocks and bonds.[5] Later studies found that portfolios which included futures would give a higher return for any given level of acceptable risk. In the early 1990s, studies started to look specifically at commodities, again with the result that adding commodity futures to one's portfolio (in addition to financial futures and other assets) allows higher returns at any given level of risk. Some studies went on to estimate the optimal percentage of commodities in portfolios. In a World Bank study, an optimal share of more than 30 per cent was found[6]; Gilbert, in a study for the London Commodity Exchange, found an optimal share of commodities of 14.9 per cent (and an additional 12.7 per cent in managed futures, which largely comprise financial futures)[7]. A number of other studies, which take the limited size of commodity futures markets into

Table 1

Arguments for and against the participation of investment funds in commodity futures markets

For:	Against:
* The returns on investment in commodity futures are no lower than those of investment in bonds or treasury bills, and may even be higher if roll-over profits are included; * the risk of such investment is not much higher than that of investment in more traditional financial instruments; * returns on commodity futures are not correlated with those on bonds, equity or treasury bills, implying that their inclusion in a portfolio gives higher profits for any given level of risk; * the return on industrial commodities is inversely correlated to bond returns, providing an inflation hedge.	* Very high transaction costs compared to other financial markets; * limited market liquidity hinders sensibly-sized involvement; * risk of market manipulation by trade houses; * long-term trend of declining commodity prices would make longer-term holdings unattractive; * lack of clear statutory authority to invest in (commodity) futures.

[5] Z. Bodie and J. Rosansky, "Risk and return in commodity futures", *Financial Analysts Journal*, October 1980. See also Z. Bodie, "Commodity futures as a hedge against inflation", *The Journal of Portfolio Management*, Spring 1983.

[6] Sudhakar Satyanarayan and Panos Varangis, *An efficient frontier for international portfolios with commodity assets*, The World Bank, International Economics Department, Policy Research Working Paper No. 1266, March 1994.

[7] Gilbert, *Commodity Fund Activity and the World Cocoa Market*, London Commodity Exchange, October 1994.

consideration, arrive at lower figures. For example, JP Morgan found an optimal share of 4 to 7 per cent, irrespective of an institution's view of market directions[8], while Goldman Sachs found an optimal share of 3.5 per cent for a UK-based portfolio[9], and another study on optimal portfolios for pension fund investments found a share of 4 to 8 per cent.[10]

9. These studies lent force to the idea of non-precious commodities as a new asset class, next to bonds, equity, real estate, gold and other more traditional asset classes, which all have their place in a balanced investment portfolio. They showed that investing in futures, including in those relating to commodities, may be risky, but that returns are generally negatively correlated to those in other markets. In particular, futures for industrial commodities (as opposed to the more weather-dependent food commodities) are also an effective inflation hedge: if inflation increases (eroding the value of conventional bonds), commodity prices tend to increase, offsetting the losses on bonds (the role of gold as an inflation hedge has thus to some extent shifted to the group of industrial commodities as a whole). Therefore, including commodities into one's portfolio can increase overall returns while reducing overall risks.[11] Investment fund treasurers normally take exposure to commodity prices through taking equity stakes in commodity producing companies, but analysis has shown that this does not provide the same type of exposure as direct involvement in commodity markets: such equity tends to behave like other equity, rather than like commodities.[12]

10. By the second half of the 1980s, a number of institutional investors (a category which encompasses insurance companies, mutual funds and pension funds) started thinking of futures, including commodity futures, as a viable way of portfolio diversification. Some set up their own futures and over-the counter markets trading departments, while others invested a generally very small part of their resources in a variety of managed funds. It should be stressed that this is a very recent development, and it is still too early to say to what extent these funds will ultimately become active in commodity markets. A small minority now allocates 1 to 3 per cent of assets to a managed fund operator; of this, maybe only one fifth will be invested in commodities, the remainder in financial futures.[13] Pension funds, among the largest institutional investors (their

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[8] D.S. Shimko & B. Masters, JP Morgan Securities Inc., *Commodities - a suitable asset class*, 20 September 1994.

[9] S. Wahdwani and M. Shah, *Commodities and portfolio performance*, Goldman Sachs Portfolio Strategy, London, September 1993; Sabre Fund Management Ltd, unpublished data, 1994.

[10] E.M. Ankrim and C.R. Hensel (Frank Russell Associates), "Commodities in asset allocation: a real-asset alternative to real estate?", *Financial Analysts Journal*, May-June 1993.

[11] Although this is the most widely-held assessment, it is not universally shared. According to some industry observers, commodity prices are a poor hedge against inflation in the long run, while it is difficult to forecast when they will provide a short-term inflation hedge - however, econometrical studies show that a range of commodities, in particular fuels, and commodity indices show a strong negative correlation to both actual and unexpected inflation (see Shimko and Masters, *op.cit.*). Also, some studies show that the systematic returns on commodity investments are close to zero, especially when transaction costs are taken into account - however, some of the assumptions used in these calculations are doubtful, especially the methods to calculate the returns on commodity investment (roll-over profits, which results from the sale of nearby futures contracts simultaneously to the purchase of further-away ones, are ignored). Nevertheless, these observers argue that pension funds and other institutional investors have no valid reason for investing in commodity markets. (see "Speculation in commodities", *Financial Times*, 9 February 1995)

[12] "Commodities - a safer bet than equities?", *World Commodity Report*, 24 March 1994.

[13] "Big bruisers", *Barron's*, May 1994.

combined worldwide assets are estimated at US$ 7 trillion), started to invest significant amounts in managed futures only in 1991. With some large pension funds already active in commodities, more are likely to follow suit, despite temporary set-backs after a number of highly-publicized losses.[14]

11. Funds typically trade in large amounts, and only on larger markets. In comparison to the size of funds, commodity futures markets are very small. For example, the margin deposits which had been paid on the total open interest of the New York coffee market, in late November 1994, added up to about US$ 200 million. Funds which are active in commodity markets easily find themselves among the largest players. One industry participant estimates the minimum market turnover for funds to become active at 5,000 lots a day, a level barely reached, for example, by the London coffee and cocoa markets.[15] They normally put large blocks of contracts on the market, or buy large blocks,[16] and are thus easily hindered by limits on their positions. Despite often strong protests from producers and consumers, in an effort to attract the funds most exchanges in the United States have in the past few years expanded their permissible trading limits for speculators, in effect allowing funds to build up much larger positions than previously possible.[17]

12. Investment funds, together with the managed funds discussed below, now account for a large part of the turnover and open interest of commodity futures markets. The International Petroleum Exchange claims a speculative participation of 20 per cent, mostly from funds. In 1993, at the New York Mercantile Exchange, about 9 per cent of open interest in crude oil futures and 27 per cent of open interest in heating oil is held by funds.[18] In 1994, on the New York Coffee, Sugar & Cocoa Exchange, they may have controlled one quarter of total open interest in coffee.[19] On the London Metal Exchange, some 5 per cent of turnover comes from funds, but indirectly, investment activity (including through warrants) may account for as much as 30 per cent of the market.[20] As one metals market participant noted, "given the size of the

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[14] As pointed out in Gilbert, op.cit., 1994, pension funds face court action if they do not invest their money prudently; and what is considered "prudent" depends very much on what other pension funds do. It should be noted that in late 1994, some company pension funds lost large sums in financial futures markets, and the companies involved decided to reimburse the pension funds for their losses, rather than face the risk of court actions. In late 1994 and mid-1995, the two largest pension funds investing in futures through managed funds (Virginia Retirement Scheme and the Kodak pension fund) decided to stop such investment. Even though at the same time, some other large pension funds entered the market, this withdrawal of two high-profile market participants may halt, for some time, the movement of pension funds into futures markets, including those in commodities.

[15] Tan Hup Tye, presentation for the "Regional Workshop on Commodity Exchanges", organized by UNCTAD/Indonesian Commodity Exchange Board, Jakarta, 17-19 May 1994.

[16] For instance, a normal trading unit for a fund active in the crude oil market is 500 to 1,000 contracts, against 100 contracts for a commercial hedger; for gold, they typically act in lots of 300-500 contracts, compared to 10 to 100 for commercial hedgers. (*Futures*, November 1991)

[17] In Europe, formal position limits do not exists. Rather, when exchange officials (and not regulators) deem participants' market shares too high, they discuss the matter with them informally (similar informal pressure is also applied at times in the United States).

[18] Emma Davey, "Oil's well that ends well", *FOW Energy Special*, 1993.

[19] "Speculators' clout may distort price picture", *The Wall Street Journal*, 31 May 1994.

[20] "Awareness grows of funds' influence", *American Metal Market*, 27 February 1995.

metal markets, only a small shift in fund investment could push prices up substantially."[21] One analyst estimated that of the US$ 600 a tonne price increase of aluminium from January to October 1994, only US$ 340 was attributable to the fundamental growth in demand; the other US$ 260 was due to fund investment.[22]

B. Managed funds

13. Although the first managed fund was created as far back as 1949, they started becoming popular only during the latter half of the 1970s. Initially, this evolution was in response to the introduction and fast development of the financial futures markets in the United States. The lot sizes on these markets were too large for many individual speculators, unlike lot sizes on commodity markets which were comfortably small. Investment money thus had to be pooled, and managed funds provided the vehicle for such pooling. It was quickly discovered that funds also provided larger "staying power" (the capacity to stay in the market without being forced out by the obligation to pay margin calls) to speculators than if they had decided to invest on their own.

14. Under the umbrella of managed funds, one can find several categories: managed accounts operated through Commodity Trading Advisors, and private and public commodity funds. The differences between them are largely legal ones, and of little importance for the discussion in this paper[23]; this section will thus not make any distinction between the various categories of managed funds.

15. Managed funds are much larger than the individual speculators of the past. There has been a strong growth of money managed by these funds, from US$ 500 million in 1980 to around US$ 23 billion in 1991, and an estimated US$ 48 billion in mid-1994.[24] According to a CFTC estimate, in mid-1994, one hedge fund alone had US$ 9 billion under management, a dozen others had a net asset value of over US$ 1 billion.[25] Only a small part of these tens of billions are invested in commodity markets. However, a growing number of managed funds has become involved also in commodities, and this number is likely to continue increasing.

16. There is still much financial space for growth of managed funds. By one 1994 estimate, around 30 billion US$ was invested in managed funds, of which around US$ 10 billion was invested in commodities; of this, US$ 7 billion were the result of the pooling of traditional speculative money, while only US$ 3 billion came from new investors - less than 0.05 per cent

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[21] "Institutions increase demand for LME metal", *Financial Times*, 26 September 1992.

[22] "Speculators ride high", *Financial Times*, 8 November 1994.

[23] For a short discussion on the different categories see Christopher L. Gilbert, op.cit., 1994; and Charles L. Hatton, *The funds: their growth and impact on metals markets*, ED&F Man, presented at Metal Bulletin's seminar on "The role of investment activity in the base metals markets", London, 11 October 1994.

[24] There are many different estimates. In an IMF study, the total capital of hedge funds was estimated at 75 to 100 billion US$ (Goldstein and Folkerts-Landau, *International Capital Markets: Developments, Prospects, and Policy Issues*, International Monetary Fund, 1994).

[25] "Cowboys of the markets", *Financial Times*, 2 June 1994.

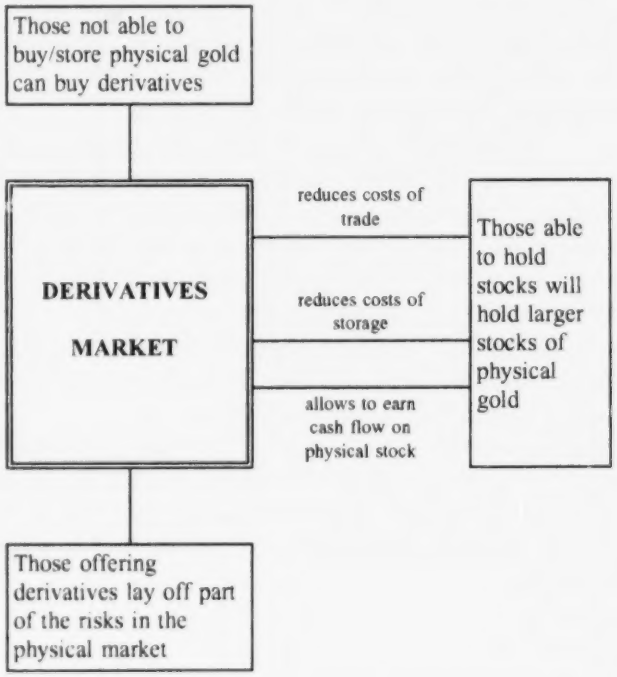
of the worldwide assets of pension funds.[26]

C. Commodity warrants as investment vehicles

17. With the recognition of commodities as a new asset class, a significant number of institutional investors (albeit still a small minority of all such investors) decided to add commodities to their portfolios. In this respect, the availability of "paper" commodities has added to rather than replaced investor demand for "real" commodities. In the case of soft commodities and non-precious metals, it seems evident that investors are unlikely to put their money in "real" commodity stocks (apart from some investment in precious metals; and contango-financing, discussed below, which does not give any exposure to commodity prices), and the availability of a paper alternative (in particular warrants) ultimately improves demand for physical commodities because those who issue the warrants, in return, are likely to cover at least part of their exposure through physical storage - analysis of the base metals markets appears to bear this out. Even for gold and silver, where traditionally there is a very largedemand for physical gold and silver as an investment tool, the availability of paper alternatives does not appear to have reduced demand for the physical metal.

Chart 2

The positive effects of gold derivatives on the physical market for gold


Those not able to buy/store physical gold can buy derivatives
DERIVATIVES MARKET
reduces costs of trade
reduces costs of storage
allows to earn cash flow on physical stock
Those able to hold stocks will hold larger stocks of physical gold
Those offering derivatives lay off part of the risks in the physical market

18. In this respect, a recent study found that in the gold market, the demand for physical gold is positively correlated to the demand for gold derivatives.[27] There were several reasons for this: firstly, the existence of derivatives helped market participants to economize on the cost of holding physical gold; secondly, derivatives allowed institutional investors to obtain exposure to gold prices for their portfolio investments, even though they were not permitted to hold gold directly; thirdly, derivatives made it possible to earn cash flows on physical stocks, rendering the holding of gold more attractive; fourthly, dealers in gold derivatives usually held gold stocks as a partial hedge; and fifthly, derivatives allowed gold dealers to reduce their bid/ask spread, and the consequent reduced transaction costs stimulated demand for physical gold.

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[26] "Diversify, but the herd will follow", *Euromoney*, December 1994.

[27] Terence F. Martell and Adam F. Gehr, Jr., *Derivative markets and the demand for gold*, World Gold Council, Geneva, April 1993.

19. As already discussed above, many funds invested in commodities by setting up a trading team that trades through brokers and on the over-the-counter market, or through placing part of their money with a managed fund. However, many institutional investors are not allowed by their statutes to invest directly in commodities, while others were not too enthusiastic about the largely short-term focus of managed funds. For these reasons, much of the initial growth in investors' interest in commodities was in commodity bonds. The bonds that were initially available were tied to one single commodity - for example gold, silver, oil, aluminium, copper, nickel, zinc or grains; many of such bonds were issued from the early 1980s onward.[28] Table 1 gives a global, somewhat simplified overview of the commodity bond market. In the beginning, virtually all bonds were issued by producing companies - to name but a few, during the 1980s, Sunshine Mining Company, operating a large United States silver mine, issued three series of silver-price linked bonds, in 1980, 1983 and 1986; in 1988, Magma Copper issued a ten-year US$ 210 million copper-indexed bond; and in 1989, British Petroleum (BP), after already issuing a 300 million US$ oil bond in 1986, issued in 1989 the largest and longest-term bond yet, a 30-year loan issue worth 500 million US$.[29] There were a number of issues by banks, but all linked to gold prices - first by the French Central Bank, in 1973, but with real popularity only arriving in 1987, with a spate of issues by a number of central and commercial banks.

Table 2

Overview of the development of the commodity bond (warrant) market

	Single-commodity bonds	Commodity indices
Initial offerings (before 1987)	First issued by producing companies, to: - obtain cheaper finance (largely for investments) - obtain a long-term hedge.	First quoted and traded on commodity futures exchanges: - the Commodity Research Bureau Index - the Metallgesellschaft Metals Index
Later developments (since 1987)	A few developing country governments issued commodity bonds in the framework of debt rescheduling programmes. Banks, including Central Banks, and non-commodity related firms started issuing commodity bonds as a way of obtaining cheaper finance. The commodity-price link was generally of the option-type (a steadily increasing interest rate once a certain price threshold was reached), and price risks were often not covered on the exchanges.	Finance houses and banks started publishing their own indices, and to offer bonds (warrants) based on them; the concomitant price risks were normally laid off through purchases of the underlying commodity futures and options. Futures and options contracts based on some of these indices were afterwards also introduced on commodity exchanges.

[28] For a more complete description of the different types of commodity bonds, see "A survey of commodity risk management instruments", UNCTAD/COM/15/Rev.1, 21 December 1994; or T. Priovolos, "Experience with commodity-linked issues", T. Priovolos and R.C. Duncan (eds), *Commodity Risk Management and Finance*, New York, Oxford University Press 1991. Note that the concept of commodity bonds is not new - already in 1863, the Confederated States of America issued a bond for which the pay-off was linked to cotton prices.

[29] For an indicative list of commodity bonds and loans, see Musa Essayyad, "Using commodity-indexed financing to fund OPEC/Alaska's development projects", *OPEC Review*, Winter 1992, Supplement; and Priovolos, o.c.. Some governments also issued commodity-linked bonds, linked to the prices of cotton (Confederated States of America, in 1863), gold (France, 1973; Belgium and Denmark, 1987; Russian Federation, 1993), oil (Mexico at five occasions between 1978 and 1985, and again in 1991; Nigeria and Venezuela in the early 1990s), or a combination of commodities (oil, cereals and meat, in the case of Uruguay in 1991).

20. In 1989 the market began greatly to expand, with many commercial banks and trading houses creating offices specializing in commodity bond issues. In 1989, in the same period that BP issued its 500 million US$ Prudhou Bay Royalty Trust, Credito Italiano, Nomura Securities International, the State Bank of South Australia, Bankers Trust and the Union Bank of Finland all issued oil-linked bonds; the latter two also issued gold-linked bonds, as did, during this period, a number of corporations which had no link at all with the gold business (such as Eastman Kodak, Hoffman La Roche and General Motors).[30] By late 1990, an average of US$ 300 million in new commodity bonds and loans were put on the market each month, and apart from bonds with option- or future-type payback profiles, banks had also started to issue long-term single commodity options - for example, JP Morgan's 100 million US$ oil bull call warrant issued in March 1994. Most of the new bonds and other issues were taken up rather easily by a wide variety of investment funds, despite defaults by a few of the initial issuers on some of their obligations. Many of the issues which have come on the market in recent years have been oversubscribed.

21. But investment in single-commodity bonds exposes the investor to rather high price risks and, as noted above, counterparty risks. For these reasons, both exchanges and investment banks decided to launch commodity indices to attract institutional investors. Exchange-traded index futures have the advantages of high liquidity (at least theoretically), good transparency and performance guarantees through the exchanges' clearing houses, while over-the-counter indices can be attractive for those wishing to take sizeable positions or unable to use futures. Already during the 1980s, London FOX (now London Commodity Exchange) introduced the Metallgesellschaft Metal Index (MGMI), and the New York Futures Exchange the Commodity Research Bureau Index (CRBI). The MGMI disappeared rapidly, while the CRBI was not actively traded until 1993. With a general growth of investor interest in commodities, the turnover of CRBI futures contracts has increased since 1993, as has that of the Goldman Sachs Commodity Index introduced by the Chicago Mercantile Exchange in 1992. In 1995, the American Stock Exchange received regulatory approval to introduce yet another exchange-traded commodity index futures, linked to the JP Morgan commodity index.

22. As already mentioned, many investment funds are not allowed to trade on futures markets. To cater to the demands for longer-term multi-commodity exposure of this group, since 1991, a number of banks and brokerage companies have issued over-the-counter warrants, which are bonds with a repayment (and/or principal) tied to the price of a number of commodities.[31] In 1989, Merrill Lynch created its Energy and Metals (ENMET) Index, and issued warrants tied to this index. This was followed by a broader commodity-indexed bond issued by Goldman, Sachs in 1991. Initially not very popular, the Goldman Sachs bonds started to become in strong demand only in 1993, when commodity prices began to increase. Other companies also started issuing commodity-index warrants in this period - in 1994 and 1995, these included Bankers

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[30] Joseph H. Mahfouz, "Designing and investing profitably in hybrid products", *Commodity Swaps*, Institute for International Research, New York 1990.

[31] For funds that could invest in futures, the market's reaction to this demand for longer-term investment was the development of relatively longer-term (buy-and-roll) oriented managed funds.

Trust, JP Morgan, and Lehman Brothers.[32] Apart from warrants linked to a general commodity price index, more specific warrants, along the idea of the ENMET index, were also introduced. For example, JP Morgan issued a mixed precious/base metals warrant followed by a base metals warrant in 1993.[33] Once an index is created, banks can issue new warrants and option-related instruments regularly; for instance, in 1994, Merrill Lynch issued a US$ 280 million call warrant issue on its ENMET Index.[34] A number of other banks as well as Lloyds have also issued long-term commodity options, mostly destined for institutional investors rather than for the public at large.

23. The period 1993-1994 thus saw a major shift of investment from financial futures to commodity futures and warrants, fueled both by a general optimism about the likelihood of commodity price increases, and low returns on the traditional bond markets. Apart from the warrants described above, a new form of investment also saw the light during this period: some institutional investors entered into metal basket swaps, that is, rather than buying warrants, they entered into bilateral agreements with investment bankers and brokers which would give them a financial pay-off dependent on the price of a basket of metals (which could be represented by one of the indices discussed above).[35] Others entered into oil swaps, at times of a highly specialized nature.[36] Before, swaps were not used for investment purposes, but were basically used by commodity producers, processors and consumers, to lock in the prices of their outputs and/or inputs.

24. On the London Metal Exchange alone, as a result of the upsurge of metal basket warrant issues, from November 1993 to April 1994 investments worth about 6 billion US$ were made.[37] Most of these issues have been taken up by institutions, including pension and insurance funds - indicating therefore that warrants are more important as an investment vehicle than investments through managed funds. Many industry observers agree that while the absolute amount of money invested in commodity markets through commodity warrants may vary from year to year, warrants are there to stay: investment funds will keep at least a certain amount in their portfolios.

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[32] See Neil Wilson, "Commodity culture", *Futures & Options World*, July 1995. For a background, see the discussion in D.C. Shimko and B. Masters, J.P. Morgan Securities Inc., *The JPMCI - a commodities benchmark*, 20 September 1994.

[33] This is an option-related bond, in which the investor receives a payout equal to any positive amount by which the oil price exceeds the lower strike price (in this case, US$ 18) up to a maximum of the higher strike price.

[34] See Kim Hunter, "Demand for metals sparks baskets", *Futures and Options World*, 20 April 1994; J. Buckley, "Which index", *World Commodity Report*, 26 January 1995.

[35] See for a more detailed description of commodity swaps UNCTAD/COM/15/Rev.1.

[36] One example is a 1 million barrel crude oil swap entered into in January 1994 by Pacific Mutual Life Insurance, a 14 billion US$ United States insurance company. This swap was not a play on crude oil prices, but on the differential between nearby and further away prices: it locked in the then prevailing, but rather exceptional contango in the oil market (normally, oil prices are in backwardation, that is, the nearby prices are higher than those quoted for further forward delivery months). Any shift of the market to backwardation would be profitable for Pacific Mutual. For a more detailed description see Risk Publications and Enron Capital & Trade Resources, *Managing Energy Price Risk*, Financial Engineering Ltd, London 1995.

[37] Sidney V. Gold, managing director of AIG International (one of the leading companies in this field), estimated in a Metal Bulletin conference on "The role of investment activity in the base metal markets", 11 October 1994, that if investment swaps and option-related contracts are included, in July 1994 as much as 16 billion US$ was invested in the London Metal Exchange alone.

D. The growing involvement of banks

25. Banks are fairly new players on futures markets; for a long time, they left hedging to their clients, and at most set up a brokerage department. This changed from the mid-1980s onward, when commodity swaps were introduced as a new risk management instrument. To be able to offer such swaps, banks were forced to develop the capacity to use futures markets in an active manner. Also, with the development of option markets, a niche was created for highly capitalized institutions with sophisticated financial engineering skills, to undertake the options arbitrage business on which the liquidity in option markets relies - and some banks found they fitted quite well in this category. Many became members, in particular of the fuels and metals exchanges, and this growing familiarity bred interest in other forms of involvement.

26. Commodity storage (except for precious metals) had, for a long time, been the preserve of those active in physical trade. Only they were able to control all operational and counterparty risks of such storage. However, the warrants issued by warehouses (different in kind from the warrants discussed above) allowed banks (and other financial institutions) to undertake storage activities without exposure to risks, especially if these warehouses were approved delivery points of one of the exchanges. Banks found they could invest in a risk-free manner in commodity futures markets, by buying cash commodities (in the form of warrants[38]) and selling futures contracts one or two years forward to earn the contango (the forward premium on the commodity futures) - for this reason, this form of investment is often called contango-financing. To close out the contracts, they can either deliver their warrants, or alternatively, roll over their position by buying nearby futures contracts, and sell further-away contracts. In theory, the contango is taken up by the cost of storing, insuring and financing the commodity. Banks are better off than other investors because they can borrow at LIBOR, and, because they generally leave their commodities in warehouses over extended periods, they can negotiate large discounts on storage costs. Hence, they are able to make small, but interesting risk-free profits through commodity storage compared to the interest they would have received on money markets.

27. Since 1992, this form of investment has become particularly prevalent for Islamic funds: as these are not allowed to place their funds in the money market against a guaranteed interest rate, obtaining the contango on the cash and carry of a commodity is for them a very attractive option for gaining a risk-free premium on their capital.

28. Financial involvement in warehousing is particularly strong in the base metals market. According to a 1994 estimate, some 55 to 60 per cent of the world's surplus metal stocks were held under warrant at warehouses approved by the London Metal Exchange, and some 35 per cent of this (with a total worth of some US$ 2.1 billion) was held as investments by banks and other financial institutions.[39] In some of the soft commodity markets, in particular that of coffee, during recent years financial institutions also controlled a considerable part of the stock.

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[38] Alternatively (and at somewhat higher risk), they could take delivery of physical commodities and store them in warehouses able to issue warrants.

[39] "Metal stocks: who benefits?", *Metal Bulletin*, 27 January 1994. Banks held another 45 per cent of LME stocks as collateral for loans to metal producers and consumers.

Chapter II

THE INFLUENCE OF NEW FORMS OF FUTURES INVESTMENT ON THE FORMATION OF COMMODITY PRICES

29. Speculators function as the lubricant in the commodity futures markets. They are willing to take positions opposite of those sought by hedgers, and in the process help to increase the overall liquidity on an exchange. Through arbitrage, they keep markets in equilibrium. There is some fear that speculation destabilizes physical market prices, through waves of large-scale speculative activities motivated by factors other than market fundamentals. Empirical studies tend to show, though, that there is a reduction in price variability in a physical market when a futures market is introduced; that price variability appears to lead to higher speculative interest, rather than the other way round[40]; and that more speculative activity tends to attract more hedgers because use of the market becomes easier. For example, according to the president of the New York Cotton Exchange, "statistics show that when we went for increased speculative limits, our volume and open interest increased by one-third."[41] Nevertheless, even though there appears to be no proof of a negative influence of the old-fashioned small speculators on the viability of the price formation process of futures markets, and many indicators for a positive influence, the same does not necessarily hold true for the new breed of non-trade related participants on commodity futures markets, the investment funds.

30. The large-scale involvement of investment funds (and other financial actors) in commodity futures markets is so recent that it is difficult to make any firm statements on their overall influence. This is particularly true for the very recent longer-term involvement in these markets through the warrant business and through contango financing. Nevertheless, the information available so far does allow some tentative conclusions to be drawn. This chapter will discuss the influence of investment fund activities on short-term and longer-term prices; the next, concluding chapter will discuss its influence on the usefulness of the commodity futures markets for risk management purposes.

A. Influence on short-term price volatility

31. As discussed earlier, both warrant-related business and contango-based financing are longer-term oriented. Although a rapid elimination of positions may well influence short-term prices (but most industry observers think that in reality, the elimination of such positions will be a gradual one), a more systematic influence on short-term price volatility is likely to come from managed funds. These funds behave differently from smaller speculators in several ways - see also table 3.[42]

32. Firstly, they tend to be active in a wide range of financial markets, and easily move from

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[40] D.J.S. Rutledge, "Trading volume and price variability: new evidence on the price effects of speculation", in Barry A. Goss (ed.), *Futures markets: their establishment & performance*, Croom Helm, London & Sydney, 1986.

[41] *Journal of Commerce*, 15 May 1991.

[42] This section is partly based on inputs provided by John H. O'Connell, Ann Prendergast and James R. Steel of REFCO Inc., New York.

one to the other. For example, developments on the European currency markets can thus flow over into the soyabean market in Chicago, the cotton market in New York or the zinc market in London. For instance, after the stock market crash of October 1987 "many of Chicago's traditional agricultural traders [said] that they [were] worried about the widening parameters of risk exposure in their markets pumped up on money from out-of-favour financial instrument markets."[43] Somewhat later, the Coffee, Sugar & Cocoa Exchange in New York was also affected: "speculative money spilled over from Chicago to New York, causing unexpected surges in the cocoa and coffee markets, and fuelling the rise in sugar prices."[44]

Table 3

Differences in market behaviour between traditional "small" speculators and new large-scale funds

	Small speculators	Funds
General position in market	Not predominantly on one side of the market.	Tend to be on the same side of the market, although they do not all enter and exit at the same time.
Impact on market liquidity	Improve liquidity.	Large orders make hedging easier for large companies. On the other hand, in times of fast price changes, they can act as a "liquidity sponge", making it very difficult for hedgers to place some of their orders.
Reaction to radical price changes	Tend to react to fundamentals, but can be forced out of market by margin calls.	Purchases and sale orders are often automatically triggered by price changes; there is a danger of a snowball effect.
Reaction to changes on other markets	Normally concentrate on one or a few markets; thus, do not react strongly on developments in other markets.	There can be strong links between commodity futures market activity and developments on other markets, in two directions: - other investments (e.g. bonds) can become more attractive, causing a withdrawal from commodity markets; - margin calls on other investments can force funds to sell their most liquid assets, which includes commodity futures.

33. The interrelation between financial and commodity markets can work in two directions. For example, during the stock market crash of 1987, "Chicago's agricultural futures markets were caught in a downslide as traders were forced to liquidate positions to cover losses in financial futures. (...) Some of the big brokerage houses had pulled their traders out of the agricultural pits as they were forced to raise margins in the financial markets."[45] Similarly, in early 1994, gold prices declined sharply after investment funds had to sell their gold holdings to be able to meet margin calls on positions in bond and currency markets.[46] In the non-precious metals markets, prices increased during most of 1994, largely due to a move of investment funds into these markets; and they declined strongly during just one day, in early February 1995, when funds decided that the profit outlook of investments in more traditional

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[43] *World Commodity Report*, 27 July 1988.

[44] *Financial Times*, 6 September 1988.

[45] *Financial Times*, 30 October 1987.

[46] "Gold's future looks dim as hedge funds sell off", *Wall Street Journal*, 8 March 1994.

assets had become more attractive.[47]

34. Secondly, while small speculators often try to learn as much as possible of the market they are going to invest in, managed fund managers are rarely interested in knowing all the fundamental supply/demand conditions of each commodity market in which they invest - or in other words, they generally do not rely on fundamental analysis. Rather, they act on the basis of computer-generated buying or selling signals, with futures market price and volume data acting as triggers (this is called "technical analysis"). Indeed, taking into account the wide array of markets on which these funds are normally active, they are hardly in a position to follow the fundamentals of each commodity in detail. Some producers, traders and consumers of commodities worry that because of this, futures markets will lose contact with the underlying market fundamentals, which would reduce their efficiency for hedging purposes.

35. Thirdly, it is often claimed that, unlike smaller speculators (who can at most times be found on both sides of the market), the funds act like a herd, following the same signals to stampede into or out of markets, to decide to be long or short. They would thus cause strong short-term volatility, exacerbating both price declines and price increases. This opinion is strongly held in particular among those who do not use futures markets: in a 1994 survey among investment management companies, insurance companies, pension funds, banks and stockbrokers, 41 per cent of those in this group who used futures thought that the participation of institutional investors increases volatility (the remainder did not think so), against 71 per cent of non-users of futures who thought institutional investors increased market volatility.[48]

36. It is true that the majority of funds uses technical analysis methods to make investment decisions. According to 1992 data from the Managed Accounts Report[49], more than one third of the funds automatically follow computer buying or selling signals. In half of the funds, the managers exercise some form of discretion in following computer-generated signals, normally through decisions on the size of the position which is to be taken. Only 8 per cent of funds is entirely focussed on fundamental analysis; and 6 per cent uses both fundamental and technical analysis.[50]

37. Technical analysis may be classified into two broad groups: chartism, and trend following. Around 10 to 20 per cent of fund managers base their trading decisions on pattern recognition, also called "charting". Essentially, chartists make hourly, daily, weekly or monthly price charts, which are believed to contain certain patterns. Patterns are supposed to be repetitive, and chartists make their buying and selling decisions on the basis of the pattern they see developing. However, this is a rather subjective form of technical analysis, as it relies on the skills of the trader to recognize a pattern - a large majority of chartists fail to make any systematic profits.

38. The remaining users of technical analysis rely basically on one of various systems of trend-following. Trend-following systems are mathematically-based, and the degree of

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[47] "Speculation in commodities", *Financial Times*, 9 February 1995.

[48] "Derivatives seen as adding to market volatility", *Financial Times*, 5 August 1994.

[49] Quoted in Gilbert, op.cit., 1994.

[50] Once their involvement in a certain commodity market becomes larger, they may start to invest more in fundamental analysis; this seems to be the case for the oil markets.

subjectivity in decisions is thus reduced to the minimum possible. These systems rely heavily on computers, and are most used by the larger managed funds. In theory, these computer-based systems can easily result in snowball effects: one fund sells for one reason or another, as a result prices decline and the computer programmes of other funds start generating selling signals.

39. In practice, the decision-making models used by funds are nowadays relatively varied. In the 1980s, funds indeed tended to have similar models and the results so obtained tended to move together. Now, partly thanks to the development of computer technology, diversity is much stronger. This diversity expresses itself through the techniques and systems used, in particular for trend analysis, and also through the choice of the time period on which a managed fund decides to concentrate. Some funds concentrate on short-term movements, moving in and out of the market over a matter of days; others keep the same position during what they perceive as a long-term trend.

40. Do managed funds really influence short-term price levels? It certainly appears that they have taken over from the more traditional speculators as scapegoats in the case of unexpected market movements. As early as in 1976, an advisory committee of the Commodity Futures Trading Commission (CFTC), the regulatory body responsible for oversight of the futures industry in the United States of America, stated that funds, through their large technically-based block orders, could lead to "technical runaways" in the market.[51] The first empirical test of such an effect followed in 1983, when the American Soybean Association charged that managed futures trading was responsible for an increased volatility in the soyabean futures market. No evidence to support these charges could be found in the subsequent empirical analysis of market data.

41. The econometric studies done since have yielded conflicting findings. In a study of 1988 and 1989 data, the CFTC analyzed the managed fund industry in more detail.[52] One of its findings was that when managed funds were active in the same market, they were generally on the same side of the market. However, they did not tend to trade in and out of their positions on the same day, and therefore, they were not a dominant factor in price formation. However, in an analysis of the behaviour of crude oil markets, the largest of all commodity markets, for the period from January 1986 to December 1994, it was found that "the ebb and flow of fund money has set oil price levels for the past two years" (but not before that).[53] Earlier, oil industry experts had noted that managed account funds were becoming the most powerful force determining the price of crude oil in any two- to four-week period.[54]

42. These contrasting findings may to a large extent reflect the rapid evolution of fund activities. Also, the functioning of companies active in the physical market has changed in recent years, making it difficult to test the influence that funds have had: for agricultural commodities

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[51] CFTC, *Report of the Advisory Committee on the Economic Role of Contract Markets*, 17 June 1976.

[52] CFTC, Division for Economic Analysis, *Survey of commodity pool operators in futures markets with an analysis of interday position changes*, January 1991.

[53] The study found that statistically, changes in speculative commitments explained around 40 per cent of changes in crude oil prices, and that each purchase of 1,000 futures contracts by speculators increases crude oil prices by 1.5 to 1.8 cts/barrel. Philip Verleger, "Hot Money", *Argus Energy Trader*, 10 February 1995.

[54] Reuter, "Funds becoming driving force in US oil price moves", 23 August 1994.

as well as minerals and metals, there has been a consolidation of trading companies and, to a lesser extent, commodity-using companies; the remaining companies are more efficiently managed, using just-in-time inventory management to keep costs down. This stock reduction by itself has contributed to the vulnerability of the market to supply or demand shocks - one therefore has to be careful to attribute higher short-term price volatility to increased fund activity.

43. Nevertheless, it is well possible that the developments on oil markets are in advance to those on other markets. Funds have become very active in the oil futures markets, as the high liquidity of these markets allows them to get into or out of large positions without affecting prices. As a corollary, because their trading decisions are determined not only by what happens in one commodity, the influence of general economic conditions on oil prices has increased. For example, when interest rates in the United States were raised in August 1994, many funds took this as a sign that the threats of inflation had been brought under control, and they reverted back to higher rate, but inflation-sensitive, investments in the financial sector; as a consequence, oil prices fell even while supply was being squeezed.

44. For the short term (during a day or a period of at most a few days), there is much anecdotical evidence of the disturbing influence of fund activity in commodity futures markets. To give a few examples: in late January 1993 New York and London coffee prices dropped strongly; this was not because of any fundamental factors, but rather, the decline was "moved by the weight of money wielded by the funds (...). The fund liquidation in New York fed on itself, sparking chart-based selling and forcing players out of the market."[55] In September 1993, "Computers [sparked a] price plunge for gold and silver".[56] On the London Metal Exchange, with a massive departure of investment funds, the prices of nickel, zinc, aluminium, lead and tin all declined by between 15 and 22 per cent during the last week of January 1995 (despite a significant decline in inventory during the same period), to increase again by 3-7 per cent in the week thereafter.

45. Investment funds thus appear to have exacerbated short-term price movements. One of the reasons is that, during periods of high volatility, funds act as a "liquidity sponge".[57] They react fast to what are perceived as new trends, buying during uptrends and selling during downtrends, absorbing with ease all offers or demands from the other side, in both cases reinforcing the price movements.[58] Hedgers can be expected to react to this: they normally sell when markets rally, buy when they fall. However, their decision processes are much slower, so when funds become active, initially, there are no "countervailing" market powers.

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[55] David Blackwell, "Coffee prices tumble further on New York fund selling", *Financial Times*, 27 January, 1993.

[56] *Financial Times*, 3 September 1993.

[57] Charles L. Hatton, op.cit.

[58] In this respect, there may be an important difference between managed funds which work on behalf of institutional investors, and "independent" funds which are more flexible (because they are less subject to regulatory oversight and to actions by shareholders). More flexible funds can buy "against the trend" with much ease, and can thus become "buyers" or "sellers" of the last resort, helping to insulate markets from extreme price movements. (see Morris Goldstein and David Folkerts-Landau, op.cit.)

B. Influence on longer-term price levels

46. It would appear that managed funds may have at times a large influence on short-term prices and price volatility, but only occasionally a strong influence on longer-term (for a period exceeding, say, 1 month) price levels. The influence of other type of investment (warrant-related or contango financing) on longer-term prices appears to be more significant. So far, none of these types of investment have been shown to have any influence on longer-term price volatility.

47. As concerns the influence of managed funds on longer-term prices, individual funds, even the largest ones, are likely to have only a limited effect on the market. Even though many managed funds are very large compared to the size of commodity markets, each single fund will voluntarily restrict its open position to a level where market prices are not directly affected - all large funds have adopted internal trading limits determining the maximum number of contracts and/or the maximum share of open interest their traders are allowed to have in each futures market. The reason for this is that the problem for managed funds is not how to build up a position in a market, but how to get out of a position before the delivery period; and a fund which has built up too large a position becomes an easy target for large trading firms, which can force the fund to liquidate its position at unattractive prices.[59] Any impact on longer-term prices will be noticeable only when funds are all on the same side of the market and/or trade in and out positions at the same time, and this during a prolonged period. So far, very little proof of such behaviour has been found.

48. Nevertheless, it has been reported at times that funds did have a longer-term influence on price levels. For example, one such reported case was in 1992, when arabica coffee prices declined from 70 cts/lb in March to 49 cts/lb in August, and then increased again to 84 cts/lb in December.[60] Also, in the cocoa market, it was noticable that from September 1993 to September 1994, fluctuations in this commodity's price directly mirrored changes in the net speculative position of large investors: the rise of cocoa prices was largely initiated and sustained by managed fund investment.[61]

49. While managed funds are likely to have an influence only at rare occasions, a stronger case can be made for the influence of warrant and contango-financing type investments on longer-term price levels. For example, a Bankers Trust study analyzed investment-fund activity in base metal markets from November 1993 to July 1994. Managed funds and large individual speculators were estimated to hold long positions of in total 1.5 million tonnes in the market; the financial warrants issued in this period gave rise to another 536,000 tonnes of buying (largely

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[59] As an example, the manager of the Mint fund (with $US 800 million of investible resources, thus being one of the larger investment funds) notes that the fund generally keeps within 10 per cent of the open position in any market. In any given market, a fund such as the Mint fund is probably making only four trading positions a year, and overall, will thus have only a limited influence on daily market movements. ("Fund manager urges more open futures markets", Reuter, 9 November 1993.) Even then, the fund can become the target of manipulation attempts; for example, in 1991, "it was suggested that some traders were attempting to force the [Mint] Fund (..which was short..) to cover at a loss 6,000 to 9,000 tonnes of nickel it had contracted to deliver in mid-August." ("US-based fund squeezed in London nickel market", *Financial Times*, July 9, 1991.)

[60] *The influence of non-trade related participation on the functioning of selected commodity exchanges*, a paper prepared on behalf of UNCTAD by Pierre Leblache, Consultabroad, New York, January 1993.

[61] Gilbert, op.cit., 1994.

call options on copper). But different from the contracts held by managed funds and individual speculators, the warrant-related contracts were almost certainly not going to be sold until maturity, regardless of metals prices. During the period investigated, base metals consumption was increased by 5.6 per cent through this warrant-related buying. The same amount may well be put on the market during 1995, when the warrants expire: an effect similar to having a new copper mine come into production. "This activity in long-term investments has never been seen before in the market to this large degree and without doubt alters normal supply/demand statistics greatly."[62]

50. In metals markets, large investors caused a large amount of metals to be taken of the market for longer-term storage, with no sign that the amount they store is likely to go down to zero again. The little proof that is available suggests that in other commodity markets as well, a significant amount of commodities has been immobilized in storage. Statistics provided by exchanges generally aggregate the positions held by managed funds and those held by other financial institutions, be it for contango-financing purposes or to lay off the risks on warrants. Not surprisingly then, these figures show that large investors are generally long. For example, in an analysis of large investment fund activities in the cocoa market of the New York Coffee, Sugar and Cocoa Exchange, it was found that these funds were consistently long during the period from July 1993 to July 1994, with a net position of 150,000 to 300,000 tonnes. Assuming that a similar amount was held on the London Commodity Exchange, it can be inferred that long-term investors held 25 to 50 per cent of the total world cocoa stock.[63] As discussed above, for contango-financing alone, banks held 35 per cent of London Metal Exchange stocks, while another 10 per cent was held to cover warrant-related price risks.

51. Although the extent of the observed shift is not fully clear, it is evident that a new category of players, who do not necessarily use the same decision criteria as the traditional industry players, has become responsible for a large part of commodity storage. In the early 1990s, the building up of this stock position, that is, the transfer of stocks from the "physical industry" to long-term oriented investors, seems to have contributed to the observed rises in commodity prices.[64] On the other hand, there is no proof that this investment interest has caused price volatility to rise. For cocoa, a 1994 study found no indication of such an influence[65], and a more recent study came to similar conclusions for metal prices, concluding that "it appears that the speculative funds have been taking the blame for volatility levels which might reasonably have been expected even in their absence".[66]

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[62] "Commodities, a return to fundamentalism?", Reuter, 19 September 1994; "Commentary: the role of investment funds", *Metals Finance*, October 1994.

[63] Gilbert, op.cit., 1994.

[64] For example, on the London Metal Exchange, metal stocks rose to unprecedented levels during 1993 and 1994, at the same time that prices increased dramatically. A major part of the world's stocks in effect shifted to LME warehouses, with producers' stocks being comparatively low by historical standards. As the LME stocks were to a large extent held by financial players, they did not exercise any downward pressure on prices. See Jim Lennon, *The growth of non-fundamental factors on the base metals markets*, paper presented at the Metal Bulletin's seminar on "The role of investment activity in the base metals markets", 11 October 1994.

[65] Gilbert, op.cit., 1994.

[66] Celso Brunetti and Cristopher L. Gilbert, *Are Metals Prices Becoming More Volatile?*, presentation at the Fifth Annual Meeting of the Minerals Economics and Management Society, Montreal, 29 March 1996.

52. There is, as yet, no agreement on the relevance of this change in composition of players active on commodity markets for the analysis of price movements. According to some, traditional price cycle analysis is largely obsolete, as prices are continuously influenced by the activities of investment funds; according to others, the investments funds' major impact is that they speed up the process of price adjustment between the situations of over- and undersupply. The first group argues that for a large part of the time, commodity price changes need no longer reflect the changes in the fundamental supply/demand balance. Prices may increase while stock levels also increase (as was indeed the case in 1993-1994), and similarly, they may decline even while physical stocks are becoming scarce. The new investors do not need commodities for their day-to-day business, and will take their decisions on the basis of **anticipated** changes in market fundamentals, rather than actual changes; such an action is likely to smooth out the long-term commodity price cycle. The second group argues that supply/demand factors are still the major forces driving prices up or down, although the reaction to a supply or demand shock has become much faster, and the market has a tendency to overreact as well. Nevertheless, when commodity prices do not reflect the fundamental supply/demand balance over a longer period, the arbitrage mechanisms between the physical market and the futures market are efficient enough to bring prices back into line.

53. Investment fund involvement may at times increase prices, while at other times depressing them. The available evidence appears to suggest that the entrance of funds into commodity markets has caused a one-time upward drift in commodity prices.[67] On the other hand, banks and funds can easily leave commodity markets again if they can find better yielding placements elsewhere; this would result in the sale of large amounts of commodities on the market. It is difficult to assess whether, if this occurred, the larger part of the positions that have been built up in the early 1990s would be eliminated again. It would appear that, as a result of the factors described earlier in this paper, commodities have become a systematic part of many investment portfolios. This suggests that market equilibrium will be found at higher stock levels than was the case until recently.[68]

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[67] This is again very difficult to test econometrically, as the behaviour of one of the major participants in commodity markets, China, has changed drastically over recent years, and moreover (as discussed above), companies active in commodity trade and processing have changed their inventory management.

[68] It should be noted, though, that producers are likely to react to the higher prices by higher production, and the final result, depending on the price elasticities of the commodities concerned, may be either positive or negative for commodity producers as a group.

Chapter III

THE INFLUENCE OF NEW FORMS OF INVESTMENT ACTIVITY ON THE EFFICIENT USE OF COMMODITY FUTURES MARKETS FOR HEDGING PURPOSES

54. It is clear from the previous chapter that investment fund activities influence the formation of commodity prices both in the short and in the long run. The role of investment funds in commodity futures trade is large, and the fact that their decision criteria and financial staying power are different from those of smaller speculators and hedgers has its consequences on the functioning of the market. The main positive effects of their involvement are a higher market liquidity and the absorption of some stocks (lifting commodity prices, as discussed above); the main negative effect being that they increase short-term price volatility and possibly may expedite the movement of medium- to long-term prices away from their equilibrium levels. The functioning of commodity exchanges as the determinants of physical market prices is thus weakened in the process. What are the consequences of this on the usefulness of commodity futures markets for buyers and sellers of commodities, in terms of their ability to meet their hedging needs and in terms of their reliance on these markets for price reference purposes?

55. All hedgers benefit from the greater liquidity created by the participation of managed funds, especially in nearer contract months (around 80 per cent of the transactions undertaken by managed funds are in the nearby futures contracts, with most of the remainder in the next maturity). Better liquidity makes it easier and cheaper to enter into and exit from hedging positions. The lower bid-ask spreads in the market are evident, among other things, from the declining incomes of locals (traders who buy and sell contracts during the same day, making a large part of their profit on the bid-ask spread) on a number of exchanges.[69] Also, the competition among brokers for larger fund investors has brought down commissions (to the extent that brokerage has become unprofitable for a number of players); most hedgers have also benefitted from this decline in transaction costs.

56. Market liquidity in further-out contract months has also improved, with banks and warrant-holders taking large positions in these far-away months; the introduction of new contract months (for example, the planned extension of the New York Mercantile Exchange crude oil contract from 3 to 7 years) is probably not unrelated to this investment interest (as well as to the growth of the over-the-counter market for swaps). Thus, the availability of more hedging tools improves the flexibility of commodity buyers and sellers. Also, through their effective arbitrage between long-term and short-term prices, banks help to keep the price relationships fair or, in other words, make longer-term risk management tools cheaper for hedgers.

57. One of the main negative effects from the involvement of the larger investment funds in commodity markets is that of an increasing short-term price volatility. Market behaviour thus becomes more erratic, in particular from the point of view of the traditional stakeholders in the commodity economy who are accustomed to neater links between supply, demand, stock movements and prices. Short-term prices, within one day or a few days, may show whipsaw-like movements sufficiently strong to throw less well prepared hedgers out of the market - and in

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[69] See for instance "CBOT to sow seeds of futures change?", *Chicago Tribune*, 22 May 1995.

particular those hedgers who do not have access to unlimited bank financing of margin calls.[70] Futures market prices may at times not be an ideal reference price for physical trade transactions, but in the absence of alternative, more efficient price formation mechanisms, market operators have to continue relying on them; this implies that they have to understand the markets well enough to know when prices are distorted. Even though some of the price formulas used in physical trade (for instance, one-month average prices, common in much of world base metals trade) may protect many producers, traders and others against such short-term market spasms, others, used to selling on the basis of day-to-day prices, need to be extremely careful.

58. Short-term volatility has one more important negative consequence: it becomes very difficult to execute standard hedging or price fixing orders. Some hedgers report that when prices move very fast, a stop-order or a price-fixing order (orders to sell or buy contracts when a certain price is reached) may be executed easily five per cent away from the intended price level. But it should be noted at the same time that, as investment funds have managed to reduce their slippage levels in recent years, this may well be a consequence of hedgers' failure to adapt to the greater complexity of the market. Those with poor communications facilities - as is the case of many developing country producers and exporters - suffer most from this situation. Also, in the case of large price movements, hedgers, if they are on the wrong side of the market, are forced to pay either very high margins to retain their hedge or to close out their positions. Hence, while hedging becomes even more important in risky markets, the higher short-term price movements caused by the "herd" or "snowball" effect of investment fund activities make normal risk management business difficult, in particular if there are no banks willing to finance margin calls.

59. Those with less market information or in a weaker bargaining position may also loose out if futures market prices stop reflecting the underlying physical market situation. For example, when arabica coffee prices declined from March to August 1992, despite worsening stock availabilities, traders started to feel that the prices were no longer fair; and during this period of price decline, they were able to make the roasters pay premiums for the better-quality coffees they bought. Producers did not claim or receive such premiums over the futures price, and were paid only the standard reference price as in normal times.[71]

60. It should be noted that the higher short-term volatility of market prices provides risks as well as opportunities. Well-organized and astute producers, traders and consumers can benefit from prices that are too high or too low, in relation to the underlying fundamentals; by futures market transactions, they can buy or sell at relatively attractive prices that may prevail only for relatively short periods. This arbitrage between the physical and futures markets carries some risks. It is also easier for those represented in locations with exchange warehouses (in most cases, this implies in the developed countries). Nevertheless, using these possibilities may well improve the prices that are finally realized.

61. In conclusion, thanks to increased investment fund activities, hedging has become cheaper,

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[70] According to the Chairman of the Coffee Futures Market Committee of the London Commodity Exchange, in his 1995 Report, "some traders have adopted a conscious policy of reducing their participation in coffee futures, so as to limit exposure to violent margin fluctuations caused by price volatility."

[71] Leblache, op.cit.

and more possibilities are opened up to hedgers. On the other hand, hedgers also have to be more careful in terms of the timing of their entering and exiting markets. They also need at times a greater access to credit to execute an effective hedging strategy. In addition, both physical and futures markets have to be monitored closely, in order to determine when futures market prices stop being a good reference price and when it is opportune to negotiate premiums with their clients. In the light of the greater complexity of the markets, only when hedgers make a conscious effort to understand the way markets function and adapt their marketing and pricing habits accordingly, will they be able to operate effectively. The more erratic commodity markets of the 1990s may provide a boon for the careful and well-prepared hedger, who has invested in information systems and communications equipment; but those which do not hedge at all, or naively continue the simple hedging strategies of the 1980s may find themselves worse off in the new market situation generated by the emergence of investment fund interest in the commodity markets.